

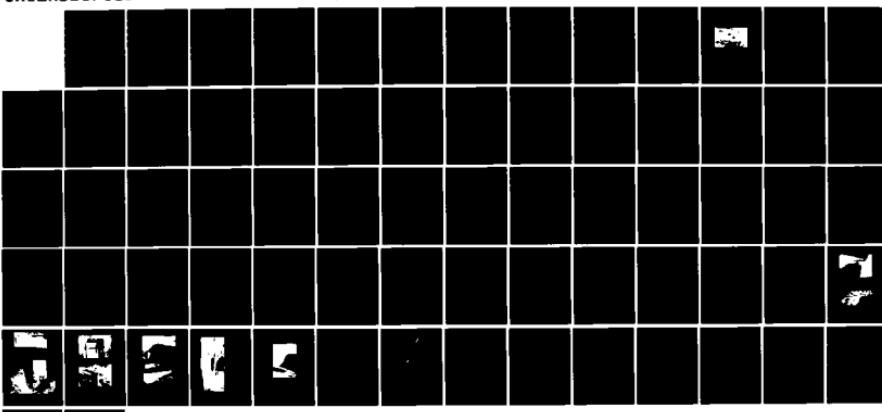
RD-A154 701

NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS
ECLIPSE DAM MA 00279. (U) CORPS OF ENGINEERS WALTHAM MA
NEW ENGLAND DIV MAR 80

1/1

UNCLASSIFIED

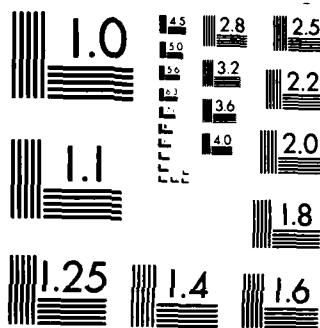
F/G 13/13 NL



END

TIMEED

REC



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963 A

OTIC FILE COPY

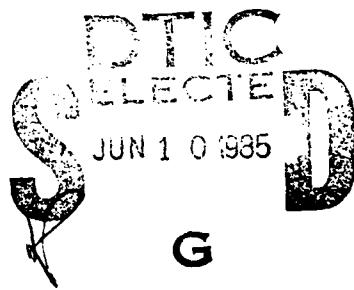
AD-A154 701

HOOSIC RIVER BASIN
NORTH ADAMS, MASSACHUSETTS

(1)

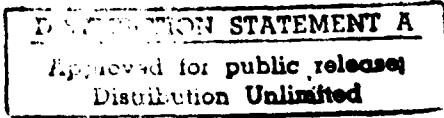
ECLIPSE DAM
MA 00279

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

MARCH 1980



85 5 20 176

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER MA 00279	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Eclipse Dam NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT
7. AUTHOR(s) U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION		8. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254		12. REPORT DATE March 1980
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		13. NUMBER OF PAGES 52
		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		16a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) APPROVAL FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) DAMS, INSPECTION, DAM SAFETY, Hoosic River Basin North Adams, Massachusetts North Branch of the Hoosic River		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Eclipse Dam includes a concrete gravity dam and spillway about 260 ft. long having a maximum height of 51.5 ft. The dam is in good condition. The size of the dam is intermediate and the hazard potential is high. An investigation is recommended to determine the ability of the structure to withstand overtopping during peak flows in the magnitude of the test flood.		



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF
NEDED

JUN 04 1980

Honorable Edward J. King
Governor of the Commonwealth of
Massachusetts
State House
Boston, Massachusetts 02133

Dear Governor King:

Inclosed is a copy of the Eclipse Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Quality Engineering, the cooperating agency for the Commonwealth of Massachusetts. In addition, a copy of the report has also been furnished the owner, the city of North Adams, North Adams, Massachusetts.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Quality Engineering for your cooperation in carrying out this program.

Sincerely,

MAX B. SCHNEIDER
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

ECLIPSE DAM
MA 00279

HOOSIC RIVER BASIN
NORTH ADAMS, MASSACHUSETTS

Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A/1	



PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

Identification No. : MA 00279

Name of Dam: ECLIPSE DAM

Town: CITY OF NORTH ADAMS

County and State: BERKSHIRE, MASSACHUSETTS

Stream: NORTH BRANCH OF THE HOOSIC RIVER

Date of Inspection: 1 May 1979 (Additional photos taken 6 August 1979)

BRIEF ASSESSMENT

Eclipse Dam includes a concrete gravity dam and spillway approximately 260 feet long having a maximum height of 51.5 feet. A 113.5 foot long ogee weir forms the spillway. The outlet works, which discharges through a 48 inch pipe, is located at the left abutment. The dam is completed by a concrete cantilevered wall extending upstream along the left bank. Reconstruction of the dam occurred in 1960 incorporating portions of a 1890 masonry dam in the new structure.

The dam is in good condition. Slight seepage was observed on the right side of the dam and some of the old masonry structures have loose and missing stonework.

Based on the size classification, intermediate, and hazard potential classification, high, in accordance with Corps of Engineers Guidelines, the adopted test flood is the PMF (Probable Maximum Flood). Hydraulic analysis indicates that the spillway capacity at top of dam is approximately 21,000 cfs which is about 64 percent of the test flood outflow of 32,760 cfs. The estimated test flood stage is about 2.8 feet above the top of dam.

An investigation is recommended to determine the ability of the structure to withstand overtopping during peak flows in the magnitude of the test flood. Monitoring of the seepage at the right side of the dam and the alignment of the top of channel left wall are recommended. Remedial measures recommended include the removal of vegetation from stone masonry joints, the replacement of missing stones in the masonry walls, the mortaring of joints of loose stones, the replacement of a missing grating panel at the outlet works and the filling of any eroded areas near the foundation of the downstream channel wall with concrete. The Owner should develop a formal maintenance program, operational procedure, and emergency procedures plan. The remedial measures and recommendations should be performed within two years of receipt of this report by the Owner.

Camp Dresser & McKee Inc.

Roger H. Wood

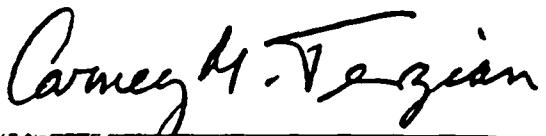
Roger H. Wood
Vice President



This Phase I Inspection Report on Eclipse Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.



JOSEPH A. MCELROY, MEMBER
Foundation & Materials Branch
Engineering Division

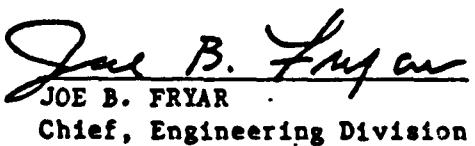


CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division



JOSEPH W. FINEGAN, JR., CHAIRMAN
Chief, Reservoir Control Center
Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:



Joe B. Fryar
JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I Investigations are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the test flood is based on the estimated "probable maximum flood" for the region (greatest reasonably possible storm runoff), or a fraction thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
Letter of Transmittal	
Brief Assessment	
Review Board Page	
Preface	i
Table of Contents	ii & iii
Overview Photo	iv
Location Map	v

REPORT

1. PROJECT INFORMATION

1.1 General	
a. Authority	1-1
b. Purpose of Inspection	1-1
1.2 Description of Project	
a. Location	1-2
b. Description of Dam and Appurtenances	1-2
c. Size Classification	1-3
d. Hazard Classification	1-3
e. Ownership	1-3
f. Operator	1-3
g. Purpose of Dam	1-3
h. Design and Construction History	1-3
i. Normal Operational Procedures	1-3
1.3 Pertinent Data	1-4

2. ENGINEERING DATA

2.1 Design	2-1
2.2 Construction	2-1
2.3 Operation	2-1
2.4 Evaluation	2-1

3. VISUAL INSPECTION

3.1 Findings	
a. General	3-1
b. Dam	3-1
c. Appurtenant Structures	3-1
d. Reservoir Area	3-2
e. Downstream Channel	3-2
3.2 Evaluation	3-2

4. OPERATIONAL PROCEDURES

4.1 Procedures	4-1
4.2 Maintenance of Dam	4-1
4.3 Maintenance of Operating Facilities	4-1
4.4 Description of any Warning System in Effect	4-1
4.5 Evaluation	4-1

TABLE OF CONTENTS (Cont'd)

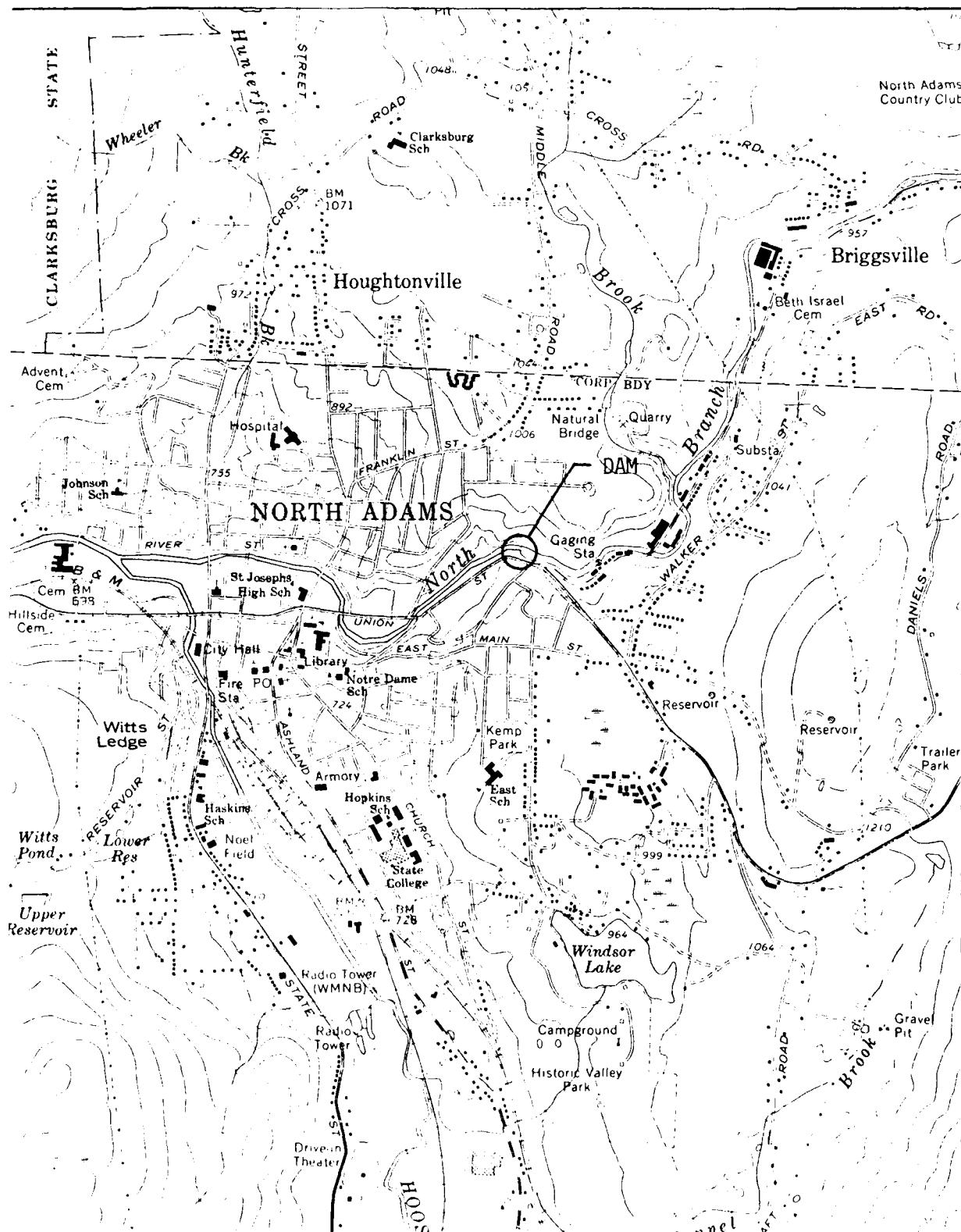
	<u>Page</u>
5. HYDRAULIC/HYDROLOGIC	
5.1 Evaluation of Features	5-1
a. General	5-1
b. Design Data	5-1
c. Experience Data	5-1
d. Visual Observations	5-1
e. Test Flood Analysis	5-1
f. Dam Failure Analysis	5-2
6. STRUCTURAL STABILITY	
6.1 Evaluation of Structural Stability	6-1
a. Visual Observation	6-1
b. Design and Construction Data	6-1
c. Operating Records	6-1
d. Post-Construction Changes	6-1
e. Seismic Stability	6-1
7. ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES	
7.1 Dam Assessment	7-1
a. Condition	7-1
b. Adequacy of Information	7-1
c. Urgency	7-1
d. Need for Additional Investigation	7-1
7.2 Recommendations	7-1
7.3 Remedial Measures	7-1
a. Operation and Maintenance Procedures	7-1
7.4 Alternatives	7-2

APPENDIXES

APPENDIX A - INSPECTION CHECKLIST	A-1
APPENDIX B - ENGINEERING DATA	B-1
APPENDIX C - PHOTOGRAPHS	C-1
APPENDIX D - HYDROLOGIC AND HYDRAULIC COMPUTATIONS	D-1
APPENDIX E - INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS	E-1



1. OVERVIEW OF DAM FROM RIGHT SIDE



DAM ECLIPSE DAM

IDENTIFICATION NO. MA 00279

LOCATION MAP
USGS QUADRANGLE

NORTH ADAMS, MASS.-VT

APPROX. SCALE: 1" = 2000'



NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

ECLIPSE DAM
MA 00279

SECTION 1: PROJECT INFORMATION

1.1. General

a. Authority - Public Law 92-367, 8 August, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a national program of dam inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region.

Camp Dresser & McKee Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Massachusetts. Authorization and notice to proceed was issued to Camp Dresser & McKee Inc. under a letter of 27 March 1979, from Colonel John P. Chandler, Corps of Engineers. Contract No. DACW 33-79-C-0053 has been assigned by the Corps of Engineers for this work. Haley and Aldrich, Inc. has been retained by Camp Dresser & McKee Inc. for the soils and geological portions of the work.

b. Purpose - The primary purpose of the investigation is to:

- (1) Perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-federal interests.
- (2) Encourage and assist the States to initiate quickly effective dam safety programs for non-Federal dams.

Update, verify and complete the National Inventory of Dams.

- (3) Remove small trees and vegetation from the stone masonry training walls.
- (4) Replace missing stones and mortar joints of loose stones in the exposed stone masonry.
- (5) Replace the steel plate on the operating platform with a grating panel.
- (6) Repair any eroded areas of ledge adjacent to the foundation of the downstream walls with concrete.
- (7) Compile the operating and maintenance procedures in writing and expand where necessary for ready reference by the operating personnel.
- (8) Provide surveillance of the dam during periods of higher than normal precipitation.
- (9) The program of periodic technical inspections should be continued on at least a biennial basis. Inspections should be planned so that low flow conditions - no water flowing over the spillway, and peak spring flow conditions - maximum annual height of water against dam, are observed as frequently as possible.
- (10) Remove silt from the upstream pool at regular intervals.
- (11) Develop a formal emergency procedures plan and warning system in cooperation with downstream officials.

7.4 Alternatives

There are no practical recommended alternatives.

SECTION 7: ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

- a. Condition - The visual examination of Eclipse Dam did not reveal any evidence of impending failure or conditions which would warrant urgent remedial treatment. The project is considered to be in good condition.
- b. Adequacy of Information - Generally, available drawings and other information gathered during the site examination were adequate for the Phase I investigation.
- c. Urgency - The recommended additional investigation and remedial measures outlined in Sections 7.2 and 7.3 respectively, should be undertaken within two years of receipt of the report by the Owner.
- d. Need for Additional Investigation - An investigation should be performed by the Owner as outlined in the following section.

7.2 Recommendations

It is recommended that the Owner engage a qualified registered professional engineer to perform the following:

- (1) An investigation to determine the ability of the dam to withstand overtopping during the test flood and to determine the effects downstream.

The Owner should implement corrective measures as required based on the above engineering evaluation.

7.3 Remedial Measures

- a. Operation and Maintenance Procedures - It is recommended that the following operation and maintenance procedures be adopted by the Owner to correct deficiencies noted during the visual examination.
 - (1) Monitor the seepage at the right side of the dam to determine if conditions or the amount of seepage is changing with time. If the seepage increases, a thorough investigation of the source of seepage should be made and remedial action taken.
 - (2) Continue to monitor the alignment of the upstream channel left wall to determine if the walls are tilting with time. If the alignment of this wall is deteriorating, a thorough investigation should be made and remedial action taken.

SECTION 6: STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

- a. Visual Observation - There was no visible evidence of dam instability during the site examination on 1 May 1979. The poor alignment of the upstream channel left wall appears to be the result of the construction rather than structural instability.
- b. Design and Construction Data - Drawings for the modification of the Eclipse Dam, show the general features of the dam but do not give data on the original construction nor the foundation. It is not practical to perform a theoretical analysis of the stability of the dam without this information and a detailed tailwater analysis which is beyond the scope of this investigation. However, the design configuration appears reasonable and would be expected to be adequately stable under static loading conditions.
- c. Operating Records - No operating records other than inspection reports by the State were located. In addition, the dam is inspected twice a year by the Corps of Engineers.
- d. Post Construction Changes - Although the dam was originally constructed in 1890, the 1960 modification was so extensive that for all practical purposes the present dam was rebuilt in 1960. No post construction changes are known since 1960.
- e. Seismic Stability - Eclipse Dam is located in Seismic Zone No. 2 and in accordance with recommended Phase I Guidelines does not warrant seismic analysis.

f. Dam Failure Analysis - Dam failure analysis was performed to assess the downstream hazards in the event of a dam failure. A peak failure outflow of approximately 45,900 cfs was estimated based on a failure of the two center monoliths of the ogee spillway with the river stage at top of dam. The design capacity of the channel downstream of Eclipse Dam is 14,600 cfs with a three foot freeboard. Maximum channel capacity with no freeboard was estimated to be 22,000 cfs indicating that approximately 24,000 cfs would overtop the downstream channel left levee. A flow of 24,000 cfs down Union Street (Route 2) represents a major potential for loss of life and property damage to the Mills and residences that are located along Union Street and adjacent to the river. Since the flood walls along the river would prohibit this flow from re-entering the channel, the discharge would flow down Union Street, which has a 0.6% slope, and enter the center of North Adams in the form of shallow-depth, high-velocity sheet flow. Accordingly, Eclipse Dam is classified as having a "high" hazard potential.

SECTION 5 : HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

- a. General - Eclipse Dam, located on the North Branch of the Hoosic River, is a run of river dam having minimal surcharge-storage capacity. The dam was modified in 1960 as part of the local flood protection works and serves primarily as a debris basin. The dam, ogee spillway and left abutment are concrete gravity sections. The left bank levee is a concrete cantilever wall. However, the dam and levee are not believed to have been designed for overtopping.
- b. Design Data - The design flow for the 1960 reconstruction of Eclipse Dam was 14,600 cfs or 375 csm with a three foot freeboard. The spillway capacity with no freeboard (water at top of dam) is 20,990 cfs or 538 csm.
- c. Experience Data - The dam has not been overtopped since its reconstruction in 1960. The maximum flow which has occurred since the reconstruction was 8,450 cfs on 10 August 1976.
- d. Visual Observation - No conditions were observed during the visual examination on 1 May 1979 that would indicate a substantial change in the hydrologic/hydraulic characteristics used in the design of the 1960 reconstruction. Discussions with maintenance personnel indicated that the upstream pool is occasionally dewatered and road gravel is retrieved from the basin using heavy equipment. Furthermore, approximately 5 ft. of silt has reportedly accumulated at the upstream face of the dam. A subsequent site visit on 6 August 1979 indicated extensive silting of the upstream pool.
- e. Test Flood Analysis - Based on the Corps of Engineers Guidelines, the recommended test flood for the size (intermediate) and hazard potential (high) is the Probable Maximum Flood (PMF). The PMF peak flow was determined using Corps of Engineers guidelines for "Estimating Maximum Probable Discharge" in Phase I Dam Safety Inspections. The watershed is characterized as rolling, and a PMF inflow rate of 840 cfs per square mile was adopted for the 39 square mile drainage area. The resulting test flood inflow is 32,760 cfs which is in agreement with the PMF estimates by the Corps of Engineers.

Since the surcharge-storage at Eclipse Dam is minimal at flows in the range of the PMF, the test flood outflow was taken as 32,760 cfs.

The spillway capacity at top of dam is 20,990 cfs or 64 percent of the test flood. At test flood stage (Elev. 834.3) the dam abutments and left bank levee would be overtopped by approximately 2.8 feet of water. Approximately 30,000 cfs will discharge over the spillway, left abutment and the concrete dam to the right of the spillway and into the downstream channel. The remaining 2,760 cfs will discharge over the left bank levee and then overland down Union Street (Route 2).

SECTION 4: OPERATIONAL PROCEDURES

- 4.1 Procedures - While some operational procedures are spelled out in the Corps of Engineers O&M Manual for the entire flood protection works, specific procedures for the normal operation of Eclipse Dam are not available.
- 4.2 Maintenance of Dam - There is no established formal procedure for the maintenance of the dam. Observed deficiencies are handled on an as needed basis.
- 4.3 Maintenance of Operating Facilities - The 48 inch reservoir drain is operated approximately 4 to 5 times per year while the 12 inch outlet is normally left in the open position. The sluice gate operators are greased, oiled and maintained on a regular basis as needed. Debris is removed from the reservoir approximately twice a year. The electric drive for the valve on the 48 inch drain was found to be inoperative during the inspection and repairs were initiated the same morning.
- 4.4 Description of Warning System in Effect - There is no established warning system or emergency preparedness plan in effect for this structure.
- 4.5 Evaluation - Formal operational procedures, maintenance programs, warning systems and emergency preparedness plans should be established for the dam.

The downstream channel left wall was found to be in very good condition. The only item noted was a local area erosion of the ledge at or near the wall foundation located several monoliths downstream of the dam.

- d. Reservoir Area - The reservoir area upstream of Eclipse Dam, shown in Photo 9, referred to as a debris basin by the design engineer, has an average width of about 220 ft, and is approximately 1200 ft. long. The right bank is steeply sloped, heavily forested and undeveloped. Visual inspection indicated that the natural slope was somewhat flattened in accordance with the design plans. The left bank consists of about 660 feet of reinforced concrete wall of the cantilever type, varying in height from 9 to 40 feet from the bottom of the footing to the top of the wall. The remainder of the left bank consists of earthen slopes. Design plans show the invert of the pool to be 10 ft. below spillway crest. State Routes 2 and 8 are parallel to the river. No significant potential was observed for landslides or rock slides into the upstream pool which could create waves that might overtop the dam. Photo 11, taken after the inspection, indicates that extensive silting of the pool has occurred.
- e. Downstream Channel - The North Branch of the Hoosic River, downstream of Eclipse Dam, shown in Photo 10, consists of approximately 7000 ft. of channelization to its junction with the South Branch and incorporates a 1000 ft. long concrete chute designed for high velocity - low stage flow. The design flow for this portion of the protection works varies from 14,600 cfs. at Eclipse Dam to 15,000 cfs at the junction of the North and South Branches. The design flood for the Hoosic River, downstream of the confluence of the North and South Branches is 24,300 cfs. The freeboard for all levees and walls and debris clearance below the low point of all bridge structures is at least three feet above the water surface for the design flood. Existing development along both banks of the downstream channel is extensive.

The rock formation of the downstream channel, just below the dam, is Shelburne Marble. Loose blocks formed by steeply dipping joint sets were observed but there were no indications of significant instability.

- 3.2 Evaluation - Eclipse Dam appears to be performing satisfactorily at the present time. The loose and missing stones in the old stone masonry structure incorporated in the present dam and the minor seepage observed at the junction of the spillway right training wall and the dam do not pose a significant hazard to the safety of the dam at the present time. However, these items and the other minor items mentioned in this section, should be attended to before they cause additional deterioration of the structure. Therefore, in general, the dam is considered in good condition.

SECTION 3: VISUAL INSPECTION

3.1 Findings

a. General - The Phase I visual examination of Eclipse Dam was conducted on 1 May 1979.

In general, the dam was observed to be in good condition. However, portions of the former masonry dam incorporated in the present dam are in need of remedial work.

Visual inspection checklists for the site visit are included in Appendix A and selected photographs are given in Appendix C. Additional photographs were taken by a staff member on 6 August 1979 when flow was being diverted through outlet works.

b. Dam - The Eclipse Dam and spillway shown in Photos 1 and 2 are generally in good condition. There was no evidence of settlement, lateral movement or significant erosion. However, the view of the spillway weir was obscured by the flowing water during the inspection. The following deficiencies were observed:

- (1) Seepage was present at the junction of the right spillway wall and the northerly concrete dam at the location indicated in Photo 5.
- (2) Stone masonry has become loose and lost on the southerly face of the spillway right side wall as shown in Photos 3 and 6. In addition, mortar has been lost from the stone joints in the same area. The spillway left side wall, shown in Photos 4 and 7, has the same deficiencies. The exposed remains of the former weir at the face of this wall contains open joints.
- (3) Several very small trees are growing in the masonry open joints of the spillway sidewalls as indicated in Photo 3.

c. Appurtenant Structures - The outlet works shown in Photo 7 was found to be in good condition except that the 48-inch sluice gate was not operable due to an electrical problem. The power utility repair crew was called during the inspection and were at work on the problem at the time of departure of the inspection team. One panel of grating has been replaced with steel plate at the operating platform as shown in Photo 8.

The upstream channel left wall was found to be in very good condition but the top of the wall has a very poor alignment as shown in Photo 7. The poor alignment may be due to poor construction or due to differential deflection of the wall. No cracking or distress was observed that would indicate the problem is one of deflection.

SECTION 2: ENGINEERING DATA

- 2.1 Design - Limited design records for this dam are available at the offices of the City Engineer in the City of North Adams. Design records are in the custody of the designer, the New York District of the Corps of Engineers.
- 2.2 Construction - Construction records for the project are in the custody of the Troy, NY field office of the New York District of the Corps of Engineers.
- 2.3 Operational Records - No operation records other than inspection records on the facility were located. Yearly inspection reports are available at the Division of Waterways, State of Massachusetts. Semi-annual inspection reports are available at the Troy, NY field office of the New York District of the Corps of Engineers.
- 2.4 Evaluation
 - a. Availability - Documents described above are generally available at the office of the City Engineer, City of North Adams, Mass. While records are available through the New York District of the Corps of Engineers, Troy, NY field office, only a partial set of record drawings and prior inspection reports for 21 September 1978 and 4 October 1979 were readily available. Summary material and correspondence on the project are available at the New York District of the Corps of Engineers in New York City.
 - b. Validity - The record drawings obtained for this project were in excellent agreement with features observed in the field.
 - c. Adequacy - The available data in combination with the visual evaluation described in the following section is adequate for the purposes of the Phase I investigation.

g. Dam

- (1) Type Concrete gravity dam with ogee spillway
- (2) Length 260 ft.
- (3) Height 51.5 ft. (Max)
- (4) Top width 2 ft.
- (5) Side slopes 1.5V to 1H U/S,vert. D/S
- (6) Zoning N/A
- (7) Impervious Core N/A
- (8) Cutoff Founded on rock
- (9) Grout Curtain None known

h. Diversion and Regulating Tunnel None

i. Spillway

- (1) Type Concrete ogee
- (2) Length of weir 113.5 ft.
- (3) Crest elevation 818.17
- (4) Gates None
- (5) U/S Channel 220 ft wide by 10 ft. deep at spillway crest
- (6) D/S Channel 120 ft wide by 14 ft deep from top of channel walls.

j. Regulating Outlets

The regulating outlet consists of a baffled concrete intake structure at the dam's left abutment and a 48-inch C.I. by-pass pipe in the concrete abutment wall and controlled by a motor operated sluice gate. The invert elevation of the intake structure is elev. 805.0 with provisions for stoplogs to allow for dewatering and to serve as a barrier for floating debris. The 48-in. by-pass pipe passes through the left abutment and bends 90 degrees to discharge through the downstream channel wall at the toe of the ogee spillway. A 12-inch pipeline controlled by a hand operated sluice gate also leaves the outlet works. The invert elevation of this pipe is 811.0

c. Elevation (ft. above NGVD)

- (1) Streambed at toe of dam 780.0
- (2) Test flood tailwater below 818.0
- (3) Upstream portal invert diversion tunnel N/A
- (4) Normal pool 818.17
- (5) Full flood control pool N/A
- (6) Spillway crest 818.17
- (7) Design surcharge (Original Design) 828.5
- (8) Top of dam 831.5
- (9) Test flood surcharge 834.3

d. Reservoir

- (1) Length of test flood pool. 1200 ft.
- (2) Length of normal pool 1200 ft.
- (3) Length of flood control pool N/A

e. Storage (acre-feet)

- (1) Normal pool 60 (Est.)
- (2) Flood control pool N/A
- (3) Spillway crest pool 60 (Est.)
- (4) Top of dam 142 (Est.)
- (5) Test flood pool 159 (Est.)

f. Reservoir Surface (acres)

- (1) Normal pool 6 (Est.)
- (2) Flood-control pool N/A
- (3) Spillway crest. 6 (Est.)
- (4) Test flood pool 6 (Est.)
- (5) Top of dam 6 (Est.)

Occasionally, the reservoir is dewatered and the accumulated gravel is retrieved from the upstream pool of the dam. While some operational procedures are spelled out in the Corps of Engineers O & M Manual for the entire flood protection works, specific procedures for the normal operation of the Eclipse Dam are not available. The normal operational procedures are performed on a demand basis.

1.3 Pertinent Data

The elevations on the design plans appear to coincide with the contours shown on USGS Quadrangle North Adams, Mass. The elevations shown on the design plans, which are believed to be NGVD, are used in this report.

- a. Drainage Area - Eclipse Dam is located on the North Branch of the Hoosic River in the City of North Adams, Massachusetts. The watershed above the dam is 39 square miles. With the exception of the area immediately adjacent to the river, the watershed is essentially undeveloped, and extends from the upper regions of Massachusetts into the State of Vermont. The area occupied by the storage pool behind Eclipse Dam is negligible compared to the total drainage area.
- b. Discharge at Dam Site - Records for discharge at the dam are based on the USGS Gaging Station No. 01332000 located 1,200 feet upstream of Eclipse Dam. Flows from the 39 sq. mi. drainage area tributary to the gage have been recorded since June 1, 1931. The notable floods which have occurred at this location are: 9,980 cfs during November 1927 and 8,950 cfs on September 21, 1938.
 - (1) Outlet works size: 48-in. diameter at invert elev. 797.0. Estimated discharge capacity with pool at spillway crest is 250 cfs.
 - (2) Maximum known flood at damsite 9,980 cfs
 - (3) Ungated spillway capacity at top of dam 20,990 cfs @ 831.5 elev.
 - (4) Ungated spillway capacity at test flood elevation 27,840 cfs @ 834.3 elev.
 - (5) Gated spillway capacity at normal pool elevation .. N/A
 - (6) Gated spillway capacity at test flood elevation .. N/A
 - (7) Total spillway capacity at test flood elevation 27,840 cfs @ 834.3 elev.
 - (8) Total project discharge at test flood elevation 32,760 cfs @ 834.3 elev.

same elevation as the top of the dam. A 12 inch pipe, which also leaves the entrance chamber, provides water for fire protection downstream. Access to the operating platform is by a fixed ladder from the left bank

- c. Size Classification - The hydraulic height of the dam is 51.5 feet and the estimated storage capacity at the top of the dam is 142 acre-feet. According to the guidelines established by the Corps of Engineers, the dam is classified in the intermediate category.
- d. Hazard Classification - Dam failure analysis indicates that if the dam failed with water at the crest of the dam, several homes, businesses and industries would be flooded. The potential for loss of life is greater than 10 persons. Therefore, the dam is classified in the "high" hazard potential category.
- e. Ownership - The dam is owned by the City of North Adams. The owner is represented by Mr. Joseph Giradi, Commissioner of Public Works, 10 Main Street, City Hall, North Adams, MA 02147 (Phone: 413/663-6765). Prior to 1958, the dam was owned by the Hoosac Mills Corp.
- f. Operator - Mr. Orlando Cilli, Superintendent of Highways, is assigned responsibility for the operation of the dam. His address is City Yard, Ashland Street, North Adams, MA 02147. (Phone: 413/663-5510)
- g. Purpose of the Dam - Eclipse Dam is part of the local flood protection system built by the Corps of Engineers for the City of North Adams, Massachusetts.
- h. Design and Construction History - The original Eclipse Dam was constructed in approximately 1890. In 1960, the Corps of Engineers modified the dam by removing the upper portion of the crest and the toe of the weir and encapsulating the remaining portion of the spillway with concrete. In addition, they added a concrete cap to the sidewalls and placed a concrete gravity dam on the upstream face of the northerly masonry wall. The work was performed by the Petricca Construction Company, 534 West Street, Pittsfield, MA. Since that time, only minor repair work has been done on the dam.
- i. Normal Operational Procedures - The dam is inspected twice a year by the Corps of Engineers. In addition, the State has inspected the dam on roughly a yearly basis. The 48-inch reservoir drain is operated approximately 4 to 5 times a year while the 12-inch sluice gate is normally left in the open position. The sluice gate operators are greased, oiled and maintained on a regular basis as needed. Debris is removed from the reservoir drain approximately twice a year.

1.2 Description of Project

- a. Location - Eclipse Dam is located on the north side of Union Street (State Routes 2 and 8) just to the west of the Gallup Street intersection in the City of North Adams, Massachusetts, as shown on the reports Location Map. Access to the north end of the dam is from the end of Front Street. The dam is on the North Branch of the Hoosic River approximately 6,000 feet upstream of its confluence with the Hoosic River and 1,200 feet downstream of the USGS Gaging Station No. 01332000. The coordinates for the dam are 73 degrees - 05.9 minutes longitude and 42 degrees - 42.1 minutes latitude.
- b. Description of Dam and Appurtenances - The Eclipse Dam is a concrete structure approximately 260 feet long impounding the waters of the North Branch of the Hoosic River. A concrete gravity wall approximately 122.5 feet long with a maximum height of 48 feet forms the right half of the dam. Portions of this section have the remains of the former masonry dam abutting its downstream face. The left half of the dam comprises of a 113.5 foot long concrete gravity ogee weir with the former masonry weir as its core on the right side and a 24 foot long outlet works and concrete wall on its left side. The maximum height of the present weir is 42 feet while the maximum height of the left wall and outlet works is 50 feet. Training walls are located on each side of the present weir. The walls partially encapsulate and extend the masonry walls of the former structure.

The impoundment of the pool is completed by a concrete cantilevered wall parallel to the river on the left bank. The wall extends approximately 140 feet upstream of the dam with the same top elevation as the dam. Upstream of this point, the elevation of the top of the wall rises as the wall continues upstream.

The downstream channel is formed by ledge rock at the invert and right bank while the left side of the channel is formed by a concrete cantilevered wall.

The outlet works is constructed of reinforced concrete and has a 18.5 foot long by 10 foot wide entrance chamber. Provision is made for stop logs at the entrance. A second set of guides for stop logs approximately 3 feet within the chamber provides a barrier to floating debris. The chamber has a concrete transverse wall starting 6 feet off the floor to act as a further barrier to floating debris. The 9 foot wide opening at the bottom of this wall has a trash rack at its upstream face. The outlet from the chamber is a 48 inch pipe which has a sluice gate at its upstream end. The pipe discharges through the downstream channel wall. The gate has a motor operated floor stand on the operating platform above the outlet works which is at the

APPENDIX A

INSPECTION TEAM ORGANIZATION AND CHECK LIST

Page No.

VISUAL INSPECTION PARTY ORGANIZATION

A-1

VISUAL INSPECTION CHECK LIST

Spillway
Outlet Works

A-2, A-3
A-4

VISUAL INSPECTION PARTY ORGANIZATION

NATIONAL DAM INSPECTION PROGRAM

DAM: ECLIPSE DAMDATE: 1 MAY 1979TIME: 900WEATHER: Clear 60° F +; Light to medium windWATER SURFACE ELEVATION UPSTREAM: 818.5 (Estimated)STREAM FLOW: 250 cfs from USGS Gage Records

INSPECTION PARTY:

1. Roger H. Wood - CDM
2. Joseph Downing - CDM
3. John Critchfield - H&A
4. Doug Gifford - H&A
5. _____

PROJECT FEATURE	INSPECTED BY	REMARKS
1. <u>Dam</u>	<u>R. Wood</u>	
2. <u>Spillway</u>	<u>R. Wood</u>	
3. <u>Outlet Works</u>	<u>R. Wood</u>	<u>Elect. Power being Fixed</u>
4. <u>Geology</u>	<u>D. Gifford</u>	

PRESENT DURING INSPECTION:

1. William Duverney - City of North Adams
2. Larry Dean - City of North Adams
3. _____

VISUAL INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: ECLIPSE DAM

DATE: 1 MAY 1979

SPILLWAY:

BY: R. WOOD

CHECK LIST	CONDITION
1. Approach Channel a. General Condition b. Obstructions c. Log Boom etc.	1. a. Excellent. b. 1 stump & 1 branch on crest. c. None.
2. Weir a. Flashboards b. Weir Elev. Control (Gate) c. Vegetation d. Seepage or Efflorescence e. Rust or Stains f. Cracks g. Condition of Joints h. Spalls, Voids Or Erosion i. Visible Reinforcement j. General Struct. Condition	2. a. None. b. None. c. None. d. Not visible due to flow. e. Not visible due to flow. f. Not visible due to flow. g. Visible portion looks good. h. Not visible due to flow. i. Not visible due to flow. j. Visible portion excellent.
3. Discharge Channel a. Apron b. Stilling Basin c. Channel Floor d. Vegetation e. Seepage f. Obstructions g. General Struct. Condition	3. a. Ledge rock good. b. None. c. Ledge OK. d. None observed. e. Not visible. f. None observed. g. Excellent.
4. Walls a. Wall Location _____ (1) Vegetation (2) Seepage or Efflorescence (3) Rust or Stains (4) Cracks (5) Condition of Joints (6) Spalls, Voids or Erosion (7) Visible Reinforcement (8) General Struct. Condition	4. a. Right wall (1) Two young trees growing in masonry portion of wall; grass in small D/S wall. (2) None observed. (3) None observed. (4) Crack in end of D/S masonry wall. (5) Good. (6) Erosion just D/S of crest stones missing - loss of mortar in joint. Rear face has unmortared joints on rear D/S face. (7) None observed. (8) Good.

VISUAL INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: ECLIPSE DAM

DATE: 1 MAY 1979

SPILLWAY: (continued)

BY: R. WOOD

CHECK LIST	CONDITION
1. Approach Channel a. General Condition b. Obstructions c. Log Boom etc.	4. b. Left Wall (1) 2 young trees in exterior face plus grass and bushes in top of D/S portion. (2) None observed. (3) None observed. (4) None observed. (5) Good. (6) Missing stone U/S corner; possible missing chunks near weir crest. (7) None observed. (8) Good condition.
2. Weir a. Flashboards b. Weir Elev. Control (Gate) c. Vegetation d. Seepage or Efflorescence e. Rust or Stains f. Cracks g. Condition of Joints h. Spalls, Voids Or Erosion i. Visible Reinforcement j. General Struct. Condition	4.
3. Discharge Channel a. Apron b. Stilling Basin c. Channel Floor d. Vegetation e. Seepage f. Obstructions g. General Struct. Condition	c. North wall of Dam (1) None observed. (2) Seepage from masonry portion at intersection with rt. spillway wall. (3) None observed. (4) None observed. (5) Good. (6) None observed. (7) None observed. (8) Excellent condition.
4. Walls a. Wall Location _____ (1) Vegetation (2) Seepage or Efflorescence (3) Rust or Stains (4) Cracks (5) Condition of Joints (6) Spalls, Voids or Erosion (7) Visible Reinforcement (8) General Struct. Condition	4. d. Downstream channel wall lt. side excellent condition but fndn eroding 2nd joint downstream of dam. 4. e. Upstream lt. wall excellent con- dition but horizontal alignment poor. Did not observe any evi- dence of movement other than alignment.

VISUAL INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: ECLIPSE DAM

DATE 1 MAY 1979

OUTLET WORKS: _____

BY: R. WOOD

CHECK LIST	CONDITION
1. Inlet a. Obstructions b. Channel c. Structure d. Screens e. Stop Logs f. Gates	1. a. Clear. b. Entrance on pool - clear. c. Reinf. concrete in good condition 1 panel of grating missing and replaced with plate. d. None. e. In place. U/S set floating, not seated. f. N/A
2. Control Facility a. Structure b. Screens c. Stop Logs d. Gates e. Conduit f. Seepage or Leaks	2. a. Concrete good condition. b. None. c. See 1e. d. 2 gates operational but no elect. power to larger gate. e. Buried - not visible. f. None observed.
3. Outlet a. Structure b. Erosion or Cavitation c. Obstructions d. Seepage or Leaks	3. a. Pipe discharge through D/S channel wall. OK. b. No material erosion observed. c. None observed. d. None observed.
4. Mechanical and Electrical a. Crane Hoist b. Hydraulic System c. Service Power d. Emergency Power e. Lighting f. Lightning Protection	4. a. N/A b. N/A. c. Under repair during inspection. d. Manual operation - operable. e. N/A f. Normal transmission protection.
5. Other	5. Railing in good condition - one top rail bent. MH rungs with safety-climb in good condition - one branch caught in rungs.

APPENDIX B

LIST OF AVAILABLE DOCUMENTS AND PRIOR INSPECTION REPORTS

<u>DOCUMENTS</u>	<u>Page No.</u>
List of Available Documents	B-1
Description of Dam (by Mass. Div. of Waterways)	B-2

PRIOR INSPECTION REPORTS

<u>DATE</u>	<u>BY</u>	<u>Page No.</u>
October 24, 1968	County of Berkshire, Mass.	B-6
June 14, 1971	Mass. Div. of Waterways	B-7
November 13, 1973	Mass. Div. of Waterways	B-8 to B-10
November 25, 1975	Mass. Div. of Waterways	B-11 to B-13
July 18, 1978	Mass. Div. of Waterways	B-14 to B-16
September 21, 1978	New York District, Corps of Engineers	B-17 to B-18
October 4, 1979	New York District, Corps of Engineers	B-19

LIST OF DOCUMENTS
ECLIPSE DAM

<u>DOCUMENT</u>	<u>LOCATION</u>
1. Design Records	New York District Corps of Engineers
2. Construction Records	New York District Corps of Engineers
3. Semi-annual Inspection Reports	New York District Corps of Engineers
4. Record Drawings	New York District Corps of Engineers and City Engineering Office, North Adams
5. O&M Manual for Flood Protection Works	New York District Corps of Engineers and City Engineering Office, North Adams

DESCRIPTION OF DAM

DISTRICT ONE.

Submitted by R D Jordan Dam No. 1-2-209-2

Date November 13, 1973 City/North Adams

Name of Dam Eclipse

1. Location: Topo Sheet No. 4-B.
Provide 8-1/2" x 11" in clear copy of topo map with location of Dam clearly indicated.
2. Year built: 1890. Year/s of subsequent repairs 1960
3. Purpose of Dam: Water Supply . Recreational .
Irrigation . Other Flood control
4. Drainage Area: 40 sq. mi. acres.
5. Normal Ponding Area: Acres; Avg. Depth .
Impoundment: 1.5 M.F. gals; acre ft.
6. No. and type of dwellings located adjacent to pond or reservoir .
i.e. summer homes etc.
7. Dimensions of Dam: Length 200. Max. Height 40'.
Slopes: Upstream Face conc.
Downstream Face conc.
Width across top .
8. Classification of Dam by Material:
Earth . Conc. Masonry x. Stone Masonry x.
Timber . Rockfill . Other .
9. A. Description of present land usage downstream of dam:
%rural; 100% urban.
B. Is there a storage area or flood plain downstream of dam which could accommodate the impoundment in the event of a complete dam failure
Yes x. No .

DAM NO. 1-2-209-2.

10. Risk to life and property in event of complete failure.

No. of people _____.

The river is contained through the City of North Adams by Concrete chute walls. Damage to low lands west of the City is Possible.

No. of homes _____.

No. of Businesses _____.

No. of Industries _____.

Type _____.

No. of Utilities _____.

Type _____.

Railroads _____.

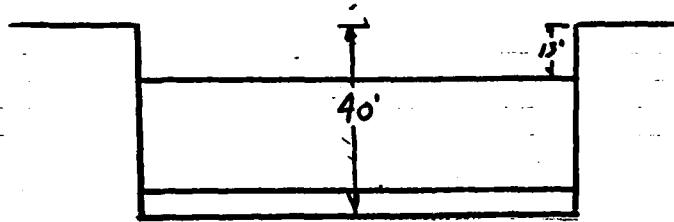
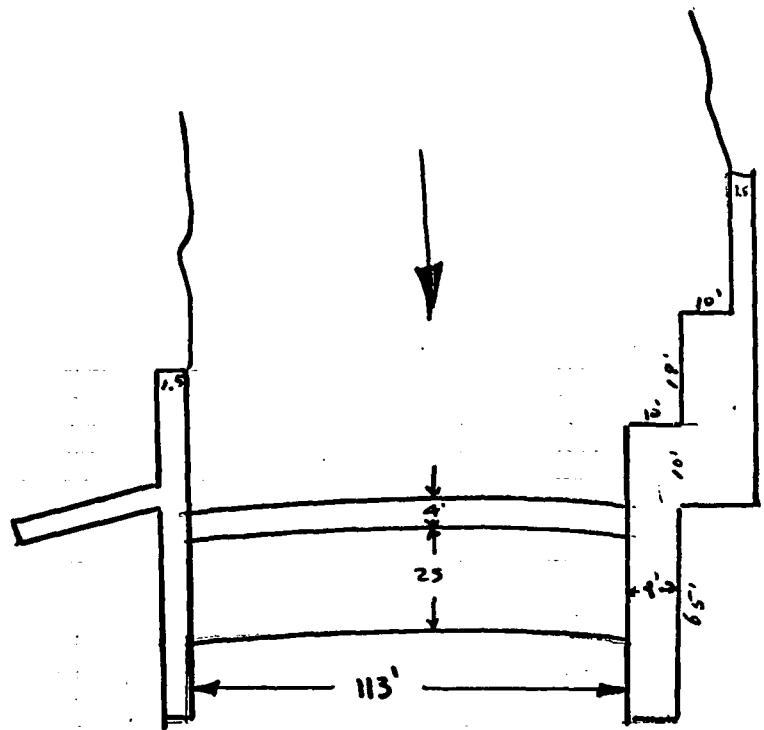
Other dams _____.

Other _____.

11.

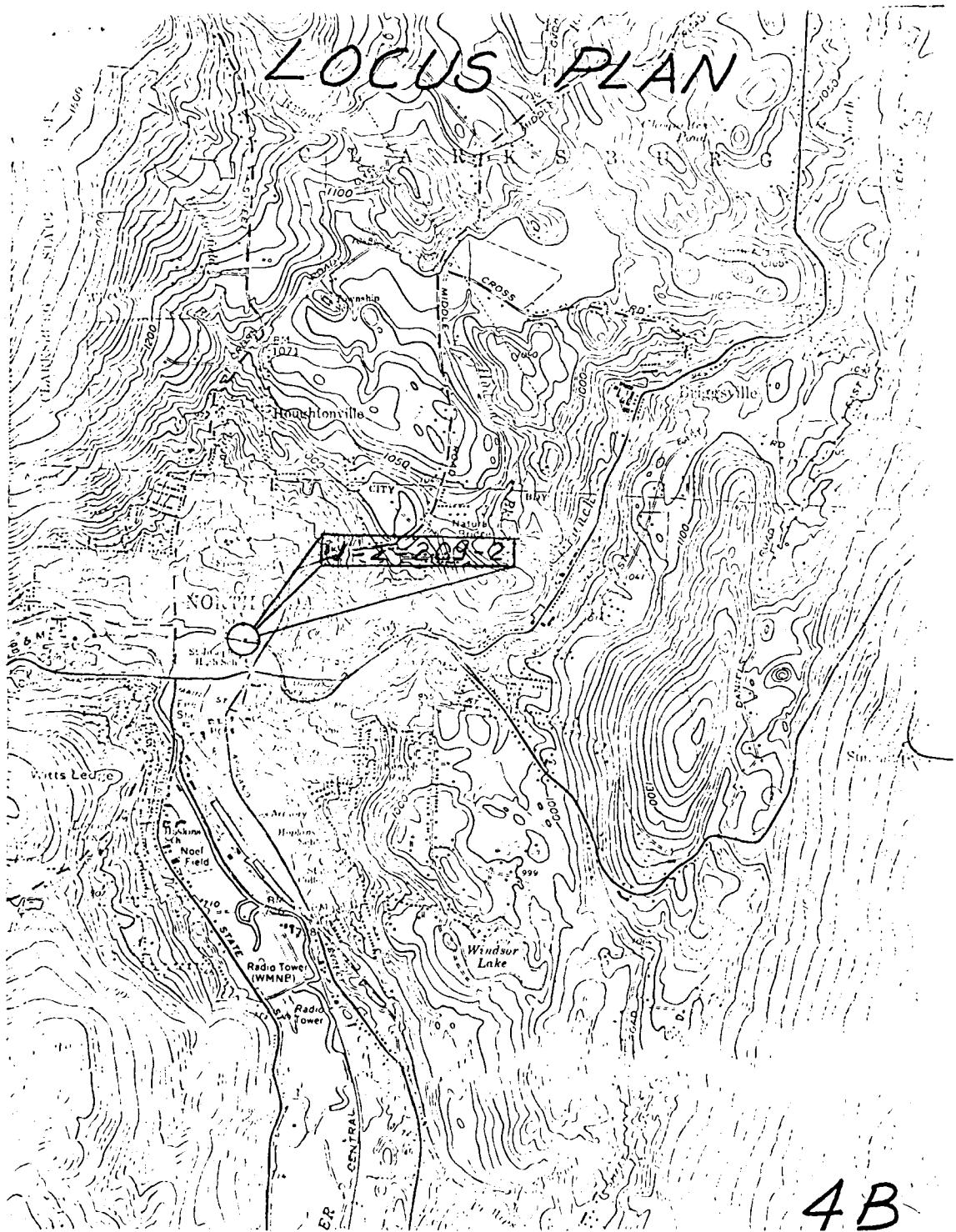
Attach Sketch of dam to this form showing section and plan on 8-1/2" x 11" sheet.

ECLIPSE DAM
1-2-209-2



APPENDIX B-4

LOCUS PLAN



4B
APPENDIX B-5

COUNTY OF BERKSHIRE, MASS.

INSPECTION OF DAMS

1-2-209-2

City or Town of North Adams Date October 24, 1968

Name of Dam Eclipse Inspector William A. Heaphy

Owner City of North Adams Address City Hall, North Adams, Mass. Tel.

Caretaker Commissioner of public works Address City Hall, North Adams, Tel. 663-6765

Location North branch Hoosac River on Union Street opposite Gallup Street

Type and Dimensions Stone masonry and reinforced concrete 250' long 40' above ledge downstream; 13' above ledge on upstream side

Spillway, type and size Concrete 113-1/4', 13' Freeboard

Outlets, type and size 48" Cast Iron pipe, 12" Cast Iron Pipe

Flashboards, type and height None

Date Built 1890 Condition Good

When last repaired 1960 By whose orders United States Corp. of Engineers.

Nature of Repairs Reinforced concrete, addition to upstream and downstream faces

K and wingwall, new gravity wall north from spillway. Crest of spillway raised 1.9'.

Purpose of Dam Stilling basin-flood control

Approximate storage of water 1,500,000 Cubic feet

Approximate area of water shed 40 Square miles

Possible damage due to failure of dam To lowlands west of city

Remarks Water at spillway level, Growth in north and south abutments. Stones coming loose and falling out.

Recommendations All growth in stonework should be removed completely. to prevent further damage. Some pointing up needed.

Dam #18-2

INSPECTION OF DAMS

City or Town of North Adams Date June 14, 1971
Name of Dam Eclipse Inspector R. Northrup & P. Fezzie
Owner City of North Adams Address City Hall, North Adams, Mass.
Caretaker City of North Adams Address City Hall, North Adams, Mass.
Location North branch Hoosac River on Union Street opposite Gallup Street.
Type of Dimensions Stone masonry and reinforced concrete, 250' long, 40' above ledge downstream; 13' above ledge upstream side,
Spillway, type and size Concrete 113' long, 13' freeboard.
Outlets, type and size 48" & 12" C.I. pipe.
Flashboards, type and height None.
Date Built 1890 Condition Good except as noted.
When last repaired 1960 By whose orders Army Corps of Engineers
Nature of Repairs Reinforced concrete addition to up and downstream faces and wing walls, new gravity wall north of spillway, spillway raised 1'9".
Purpose of Dam Stilling basin flood control.
Approximate storage of water 1,500,000 cubic feet.
Approximate area of water shed 40 square miles.
Possible damage due to failure of dam To lowlands west of city.
Remarks North side of spillway leaking at abutment, growth in abutments and masonry missing. Debris in outlet. No water ponded, outlet open.
Recommendations Repair abutments as needed.

Corrective Action:

INSPECTION REPORT - DAMS AND RESERVOIRS

1. Location: GENESIO A BREDA, NORTH ADAMS Dam No. 1-2-209-2.Name of Dam Eclipse Inspected by: RDJordan - PFFezzieDate of Inspection 11/13/73.2. Owner/s: per: Assessors Assessors Prev. Inspection X.Reg. of Deeds Pers. Contact .1. City of North Adams City Hall North Adams
Name St. & No. City/Town State Tel. No.2.
Name St. & No. City/Town State Tel. No.3.
Name St. & No. City/Town State Tel. No.3. Caretaker [if any] e.g. superintendent, plant manager, appointed by absentee owner, appointed by multi owners.
Genesio A Breda City Engineer
Name St. & No. City/Town State Tel. No.4. No. of Pictures taken 3.

5. Degree of Hazard: [if dam should fail completely]*

1. Minor . 2. Moderate X .
 3. Severe . 4. Disastrous .

*This rating may change as land use changes [future development]

6. Outlet Control: Automatic X Manual X.Operative X yes no .Comments: _____

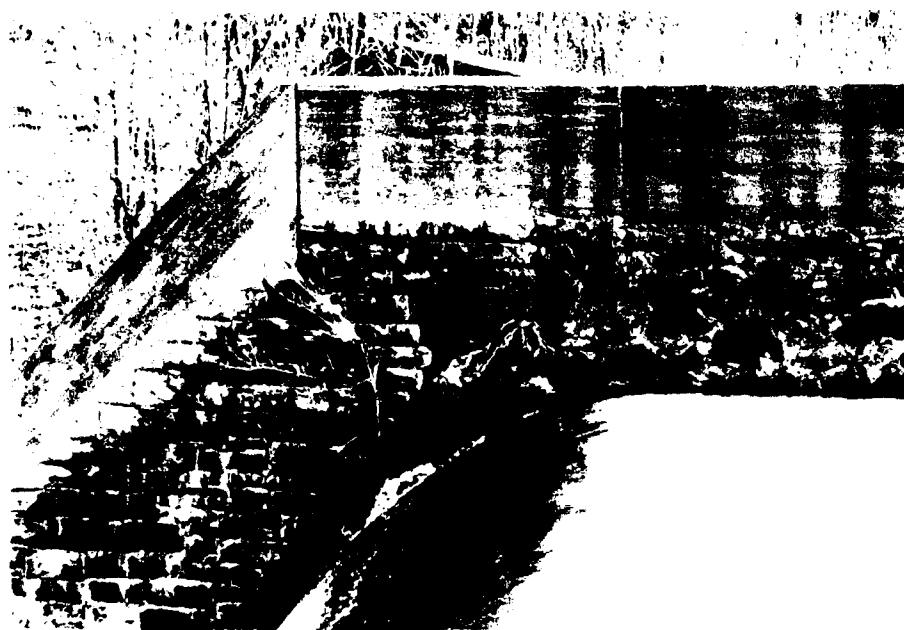
Upstream face of Dam: Condition:

1. Good X . 2. Minor Repairs .
 3. Major Repairs . 4. Urgent Repairs .

Comments: _____



2. VIEW OF SPILLWAY FROM DOWNSTREAM LEFT SIDE.

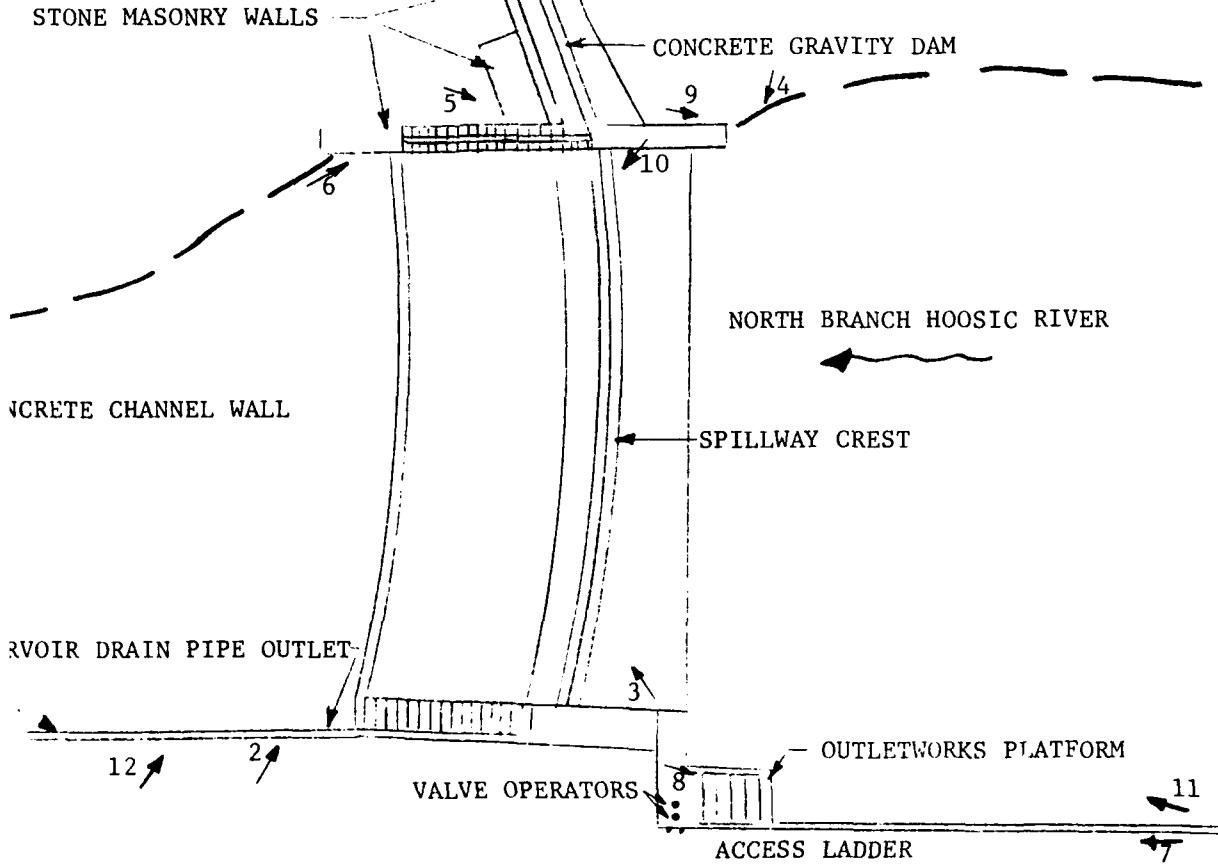


3. SPILLWAY RIGHT SIDE WALL WITH CONCRETE DAM IN BACKGROUND.
NOTE VOIDS AND TREE GROWTH IN SIDE WALL.

NORTH

NOTES:

1. PLAN BASED ON U.S. CORPS OF ENGINEERS
N.Y. DISTRICT PLAN CC-NA-672 (SHT. 32)
DATED 30 DEC. 1957 AND FIELD OBSERVATION
2. 1 DENOTES PHOTOGRAPH NUMBER AND
DIRECTION OF VIEW



UNION STREET (STATE ROUTE 2 & 8)

CAMP DRESSER & MCKEE, INC. BOSTON, MASSACHUSETTS	U.S. ARMY ENG. DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MA.
---	---

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

LOCATION OF PHOTOGRAPHS

ECLIPSE DAM

MASSACHUSETTS

Scale: Not To Scale

Date: June 1979

APPENDIX C-1

APPENDIX C

SELECTED PHOTOGRAPHS OF PROJECT

Page No.

LOCATION PLAN

Location of Photographs C-1

PHOTOGRAPHS

<u>No.</u>	<u>Title</u>	<u>Page No.</u>
1.	Overview of Dam From Right Side	iv
2.	View of Spillway From Downstream Left Side	C-2
3.	Spillway Right Side Wall With Concrete Dam in Background	C-2
4.	Spillway Left Side Wall	C-3
5.	Stone Masonry Intersection Downstream Face of Concrete Dam and Shore Face of Spillway Right Sidewall	C-3
6.	Downstream End of Spillway Right Side Wall and Downstream Masonry Wall	C-3
7.	Telephoto View of Outlet Works	C-4
8.	Valve Operators on Outlet Works Platform	C-4
9.	Upstream Channel	C-5
10.	Downstream Channel	C-5
11.	Overview of Pool Area from Upstream Left Bank on August 6, 1979	C-6
12.	Downstream Face of Weir with No Flow Over Spillway on August 6, 1979	C-7

NORTH ADAMS, MASSACHUSETTS

Superintendent: Mayor of North Adams

Date of Inspection: 4 October 1979

1. The authorized Federal Project extends along the Hoosic River and the North and South Branches. The project involves a channel improvement works through the entire city, including Braytonville, for a distance of approx., 30,000 feet. Construction was divided into six (6) units and was completed in June 1961.

2. Those in attendance were:

W. Duvaney - City of North Adams, Dept. of Public Works
N. A. Rozelle - Albany Field Office, Corps of Engineers

3. The following observations were made:

a. General - Some tree planting along the highway adjacent to the area of Eclipse Dam improves the appearance of the project.

b. Levees - The levees were in good shape and no sloughing was observed.

c. Floodwalls - Movement of wall panels on the right side just upstream from the new lower Union Street Bridge has been reported previously. Measurements will be taken quarterly to monitor any displacement. There is a crack in the right wall upstream from the New Marshall Street Bridge (by Firestone Store) that should be watched. A new section of fencing had been installed on the left wall opposite the drop structure below Brown Street bridge. There is some spalling starting to develop in the right wall near the weir at the lower end of the project. The wall should be watched. Also, a new U.S.G.S. gage station has been installed on the left side near the weir. There is some minor spalling of the concrete wall between the second and third panels on the right side below the bridge to the Hunter Co. Also, on the South Branch, the wall on the right

d. Drainage Structures - These appear to be well greased.

e. Closure Structure - The aluminum stop-logs are at the access ramp to the chute. The chain falls is kept at the Public Works Garage.

f. Pumping Plant - The pumps were operated. The tape on the float was broken.

g. Channels & Floodways - The floor of the channel just downstream from the New Brown Street Bridge has become somewhat worse than previously observed. Flow was high enough to completely cover the eroded section but clear enough to permit seeing the deterioration. The bank on the right side at the U.S.G.S. Dam has fallen in again and is slowly growing in size. The bank should be monitored. Weeds and small brush should be cut and sprayed to control growth in the riprap and wetted area at the water level.

h. Miscellaneous Facilities - A request for lowering a privately owned bridge of the Sprague Electric Company has been approved. The bridge is within their property and allows passage of heavy trucks from one side to the other.

4. Comments - The recently discovered displacement of the concrete wall panels on the right side, mentioned above, will be measured quarterly.

5. Recommendations - The concrete wall on the right side of the South Branch where spalling has occurred should be patched and the shoal below Greylock Bridge should be removed.

MOQUIN/ROZELLE/ec

NORTH ADAMS, MASS. (cont'd.)

4. Comments - The floodwall at Protection Ave. has been surveyed periodically by this office to determine movement. Engineering Div. has been given the data after each inspection. The area just below the Eclipse Dam is being cleaned-up.

5. Recommendations - The concrete wall near B. & W. R. R. Bridge should be monitored for further movement. The concrete flume below the Brown St. Bridge should be inspected by Engineering Div. to determine what corrective actions should be taken to prevent further deterioration of the floor sections.

ROZELLE/ec

NORTH ADAMS, MASSACHUSETTS

Superintendent: Mayor of North Adams

Date of Inspection: 21 September 1978

1. The authorized Federal Project extends along the Hoosic River and the North and South Branches. The project involves a channel improvement works through the entire city, including Braytonville, for a distance of approximately 30,000 feet. Construction was divided into six units and was completed in June 1961.

2. Those attending the inspection were:

Col. Gump - - - - -	N. Y. District, Corps of Engineers
J. Dioguardi - - - - -	" " " " "
F. Moquin - - - - -	Albany Field Office, Corps of Engineers
E. Breda - - - - -	City of North Adams
J. Giardi - - - - -	" " " " "

3. The following observations were made:

- a. General - The project appeared to be in good condition.
- b. Levees - Routine mowing had been performed on the levee. However, brush and weeds in the riprap on both sides of the bridge to the Hunter Machine Company should be cut and sprayed to control growth.
- c. Floodwalls - The wall on the right side, near B. & M. R.R. Bridge has moved slightly. The spalled area should be checked at the next inspection for further deterioration and possible patching.
- d. Drainage Structures - These appeared to be operable. An end plate was missing from the gear housing on the valve control equipment at the Eclipse Dam and should be replaced.
- e. Closure Structures - The aluminum stop-log structure on Union St. was stacked near the access ramp.
- f. Pumping Plants - The float is missing from the well and the tape is twisted and out of shape. The automatic equipment should be inspected closely at the next inspection.
- g. Channels and Floodways - Shoals and snags had been removed from channel between the Eclipse Dam and upstream weir. The concrete flume, downstream from Brown St., is displaced and has eroded. Shoaling downstream from the Brown St. Bridge drop structure had been removed. Also, shoaling in the vicinity of the Braytonville Bridge had been removed. One shoal below the Graylock Bridge was noted.
- h. Miscellaneous Facilities - The guard rail at the access road to Hunter Machine should be checked for further deterioration. A two foot section of chain-link fencing is missing at the northwest end of the Eagle St. Bridge and should be replaced.

- 3 -

12. Remarks & Recommendations; (Fully Explain)

Light brush is growing from both stone masonry abutments. Considerable mortar is missing from the right abutment and several stones have been dislodged.

The owner should be advised to replace the stones and mortar the joints before extensive damage to the abutment occurs.

Much trash has accumulated ~~at~~ the drawdown gate. ¹⁵ A large tree ~~has~~ jammed against the left abutment.

For location see Topo Sheet 4-B.

13. Overall Con

1. Safe _____
 2. Minor repairs needed _____
 3. Conditionally safe - major repairs needed _____
 4. Unsafe _____
 5. Receiving impoundment no longer exists (explain) _____
Recommend removal from inspection list _____

L-168-A

DAM NO. 1-2-209-2

8. Downstream Face of Dam:

Condition: 1. Good 2. Minor Repairs _____
3. Major Repairs _____ 4. Urgent Repairs _____

9. Emergency Spillway

Condition: 1. Good _____ 2. Minor Repairs _____
3. Major Repairs _____ 4. Urgent Repairs _____

Comments: _____

10. Water level at time of inspection _____ above _____ below _____
top of dam _____
principal spillway _____
other Gate open, pond drained.....

11. Summary of Deficiencies Noted:

Growth (Trees & Brush) on Embankment _____
 Animal Burrows and Washouts _____
 Damage to slopes or top of dam _____
 Cracked or damaged masonry _____
 Evidence of seepage _____
 Evidence of piping _____
 Erosion _____
 Leaks _____
 Trash and/or debris impeding flow _____
 Clogged or blocked spillway _____
 Other _____

L-168

INSPECTION REPORT - DAMS AND RESERVOIRS

1. Location: City/Town North Adams Dam No. 1-2-209-2
Name of Dam Eclipse Inspected by PJJordan-RSpaniol
Date of Inspection July 18, 1978
Previous Inspection November 25, 1975

2. Owner/s per: Assessors _____
Reg. of Deeds _____ Personal Contact _____

1. City of North Adams City Hall North Adams, MA
Name _____ St. & No. _____ City/Town/State _____ Tel. No. _____

2. _____ Name _____ St. & No. _____ City/Town/State _____ Tel. No. _____

3. Caretaker (if any) e.g. superintendent, plant manager, appointed by absentee owner, appointed by multi owners.

Name _____ St. & No. _____ City/Town /State _____ Tel. No. _____

4. No. of Pictures taken 1

5. Degree of Hazard: (If dam should fail completely)*

1. Minor _____ 2. Moderate X

3. Severe _____ 4. Disastrous _____

*This rating may change as land use changes (future development)

6. Outlet Control: Automatic _____ Manual X
Operative X Yes _____ No _____

Comments: _____

7. Upstream Face of Dam:

Condition: 1. Good _____ 2. Minor Repairs X
3. Major Repairs _____ 4. Urgent Repairs _____

Comments: _____

12. Remarks & Recommendations: [Fully Explain] Prev. insp. date 11-13-73

Both abutments of this structure are in need of repointing. This condition was reported in 1971 and 1973. The downstream wall at the left abutment has brush growing between the stones which has damaged the mortar. The brush should be removed and the joints repointed as needed. No other deficiencies were noted at the inspection.

For location see topo sheet no. 48

13. Overall Condition:

1. Safe
2. Minor repairs needed
3. Conditionally safe - major repairs needed _____.
4. Unsafe _____.
5. Reservoir impoundment no longer exists [explain]
Recommend removal from inspection list _____.

8. Downstream Face of Dam: Condition: 1. Good 2. Minor Repairs
3. Major Repairs 4. Urgent Repairs

Comments: _____

9. Emergency Spillway: Condition: 1. Good 2. Minor Repairs
3. Major Repairs 4. Urgent Repairs

Comments: _____

10. Water level @ time of inspection: 0.2 ft. above below
top of dam
principal spillway
other

11. Summary of Deficiencies Noted:

Growth [Trees and Brush] on Embankment
Animal Burrows and Washouts
Damage to slopes or top of dam
Cracked or Damaged Masonry
Evidence of Seepage
Evidence of Piping
Erosion
Leaks
Trash and/or debris impeding flow
Clogged or blocked spillway
Other

INSPECTION REPORT - DAMS AND RESERVOIRS

1. Location: City/Town North Adams. Dam No. 1-2-209-2.
 Name of Dam Eclipse. Inspected by: Jordan.
 Date of Inspection 11-25-75.

2. Owner/s: per: Assessors . Prev. Inspection .
 Reg. of Deeds . Pers. Contact .

1. City of North Adams City Hall North Adams Mass.
 Name St. & No. City/Town State Tel. No.

2.
 Name St. & No. City/Town State Tel. No.

3.
 Name St. & No. City/Town State Tel. No.

3. Caretaker [if any] e.g. superintendent, plant manager, appointed by absentee owner, appointed by multi owners.

Name St. & No. City/Town State Tel. No.

4. No. of Pictures taken 3.

5. Degree of Hazard: [if dam should fail completely]*

1. Minor . 2. Moderate x.
 3. Severe . 4. Disastrous .

*This rating may change as land use changes [future development]

6. Outlet Control: Automatic . Manual .

Operative x yes: no.

Comments: _____

Upstream Face of Dam: Condition:

1. Good . 2. Minor Repairs x.
 3. Major Repairs . 4. Urgent Repairs .

Comments: _____

12. Remarks & Recommendations: [Fully Explain]

No changes noted since the 1971 inspection. Mortar is missing from both abutments walls. These areas should be patched before damage by freezing and thawing occurs.

There is brush growing from the joints in the south wall, which should be removed..

On the date of this inspection approximately 0.1' of water was flowing over the spillway therefore, we were unable to observe any leaking at ~~the~~^{THIS} north abutment. (as rep't in 1971)

Except for the noted deficiencies, the dam appears to be in good condition, and in my opinion, it is safe.

13. Overall Condition:

1. Safe _____.
2. Minor repairs needed _____.
3. Conditionally safe - major repairs needed _____.
4. Unsafe _____.
5. Reservoir impoundment no longer exists [explain]
Recommend removal from inspection list _____.

8. Downstream Face of Dam: Condition: 1. Good 2. Minor Repairs
3. Major Repairs 4. Urgent Repairs

Comments: _____

9. Emergency Spillway: Condition: 1. Good 2. Minor Repairs
3. Major Repairs 4. Urgent Repairs

Comments: _____

10. Water level @ time of inspection: 0.1 ft. above below
top of dam
principal spillway _____
other _____

11. Summary of Deficiencies Noted:

Growth [Trees and Brush] on Embankment
Animal Burrows and Washouts _____
Damage to slopes or top of dam _____
Cracked or Damaged Masonry
Evidence of Seepage _____
Evidence of Piping _____
Erosion _____
Leaks _____
Trash and/or debris impeding flow _____
Clogged or blocked spillway _____
Other _____



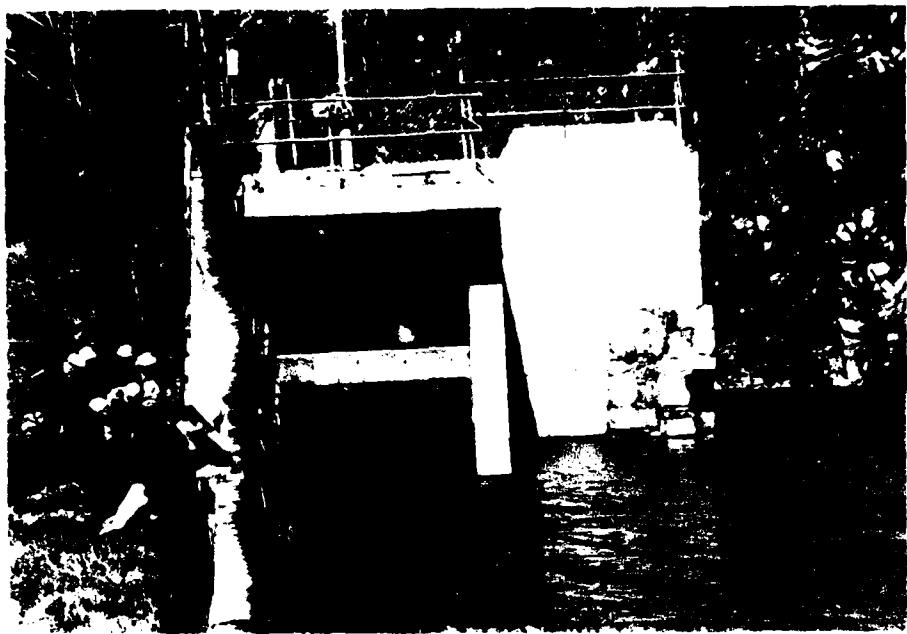
4. SPILLWAY LEFT SIDE WALL. NOTE ROUNDED STONES AND OPEN JOINTS.



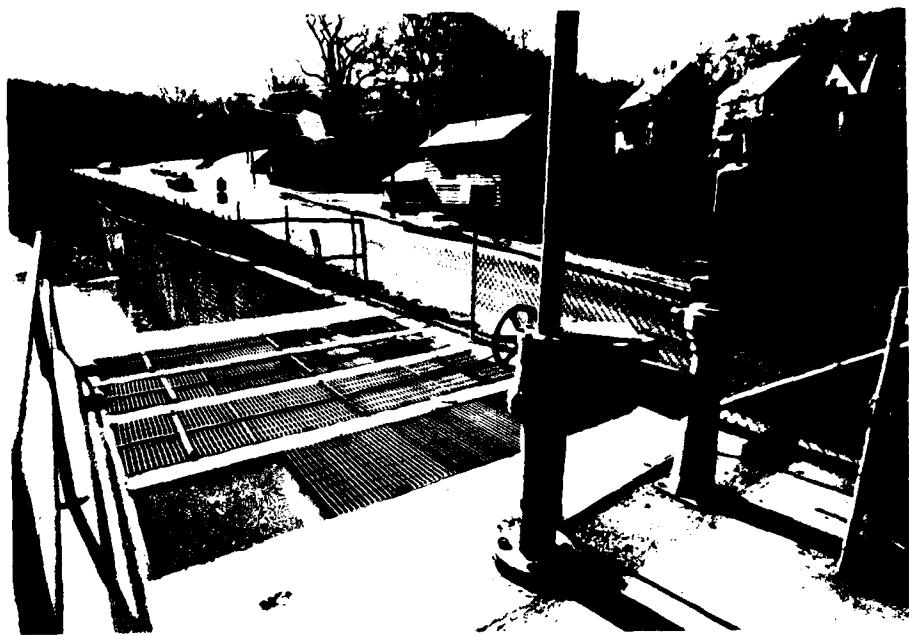
5. STONE MASONRY INTERSECTION DOWN-STREAM FACE OF CONCRETE DAM AND SHORE FACE OF SPILLWAY RIGHT SIDE WALL.



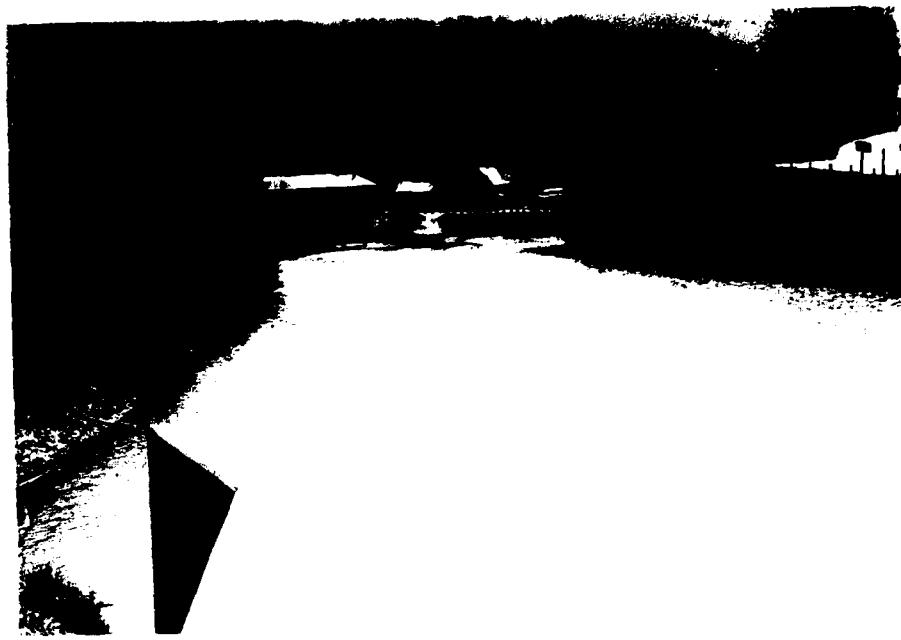
6. DOWNSTREAM END OF SPILLWAY RIGHT SIDE WALL AND DOWNSTREAM MASONRY WALL.



7. TELEPHOTO VIEW OF OUTLET WORKS. NOTE ALIGNMENT OF LEFT UPSTREAM CHANNEL WALL.



8. VALVE OPERATORS ON OUTLET WORKS PLATFORM.



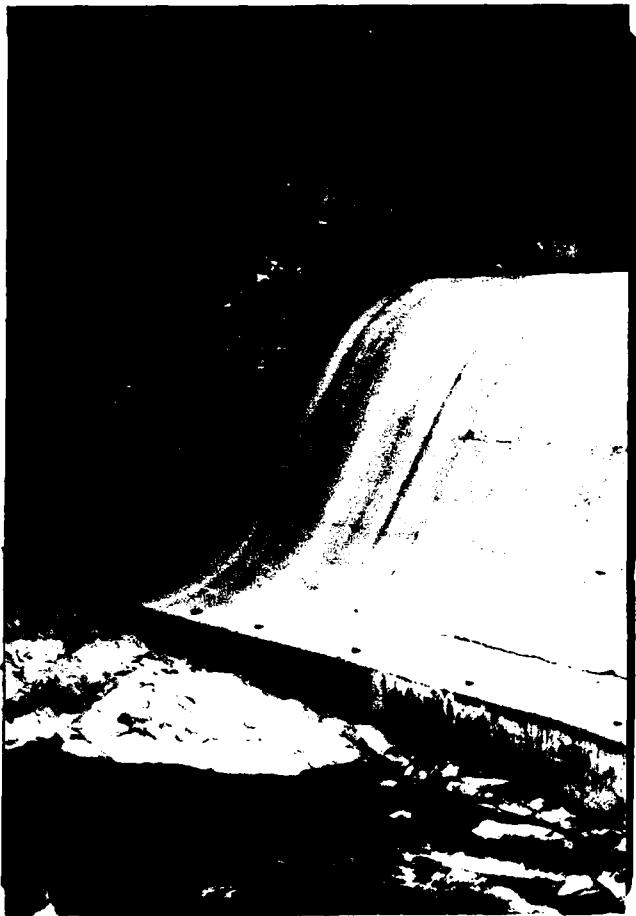
9. UPSTREAM CHANNEL.



10. DOWNSTREAM CHANNEL. DISCHARGE PIPE FROM OUTLET WORKS AT END OF CONCRETE WALL LEFT SIDE OF PHOTO.



11. OVERVIEW OF POOL AREA FROM UPSTREAM LEFT BANK ON AUGUST 6, 1979. NOTE SEDIMENTATION.

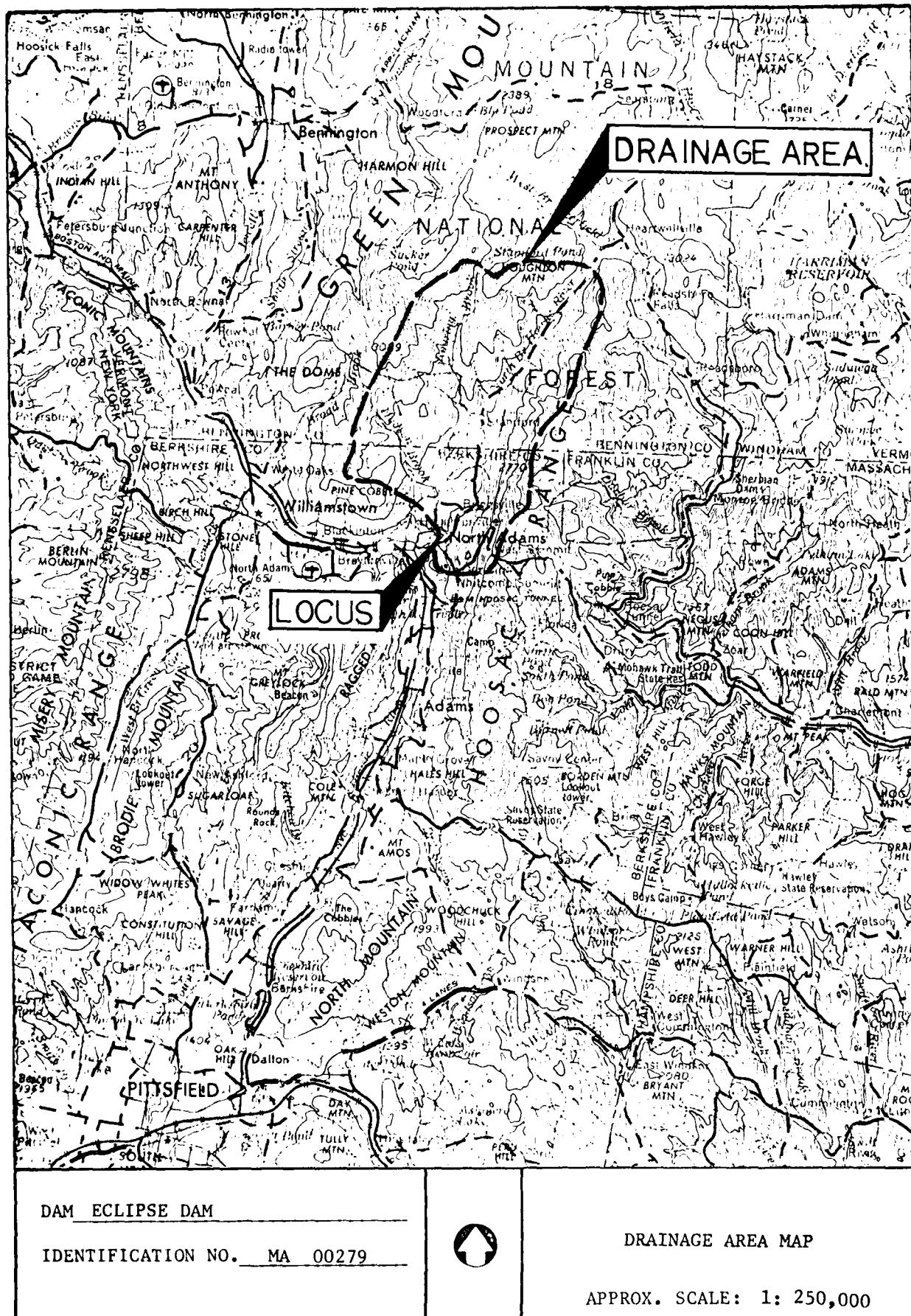


12. DOWNSTREAM FACE OF WEIR WITH NO FLOW OVER SPILLWAY, PHOTO TAKEN 6 AUGUST 1979.

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

	<u>Page No.</u>
Drainage Area Map	D-1
 <u>COMPUTATIONS</u>	
Elevations, Drainage Area, Storage Capacities, Size Classification, Hazard Classification, Test Flood	D-2
Probable Maximum Flood, Surcharge-Storage Routing, Stage-Discharge Relationships	D-3
Tailwater Analysis and Outlet Works Capacity	D-5
Dam Failure Analysis	D-6
Dam Failure Impact Area Map	D-7



CAMP DREIBER & MORKE INC. CLIENT COE JOB NO 300-6-RT-3 PAGE 1
 PROJECT ECLIPSE DAM DATE CHECKED 2-27-79 DATE 2/11/79
 DETAIL ECLIPSE DAM CHECKED BY Joe A. COMPUTED BY JED

ELEVATIONS

Spillway Crest = 818.17
 Top of Dam = 831.5
 Toe of Spillway = 780.0

$$\therefore \text{Hydraulic Ht.} = 831.5 - 780.0 = 51.5 \text{ ft.}$$

DRAINAGE AREA

At USGS Gage No. 01332000, approx. 1200 ft. upstream of
 Eclipse Dam: 39 sq. mi.

STORAGE CAPACITIES

length of river between Eclipse Dam and USGS Gage
 control = 1200 ft. ; Avg. Channel width = 200 ft. ; Avg.
 Channel Inv. = 0.25.0

$$\text{Storage at Spillway crest elev. 818.17} = \frac{1200 \times 200 \times 10}{43560} = 60 \text{ ac.-ft.}$$

$$\text{Storage at top of dam elev. 831.5} = 60 + \frac{1200 \times 200 \times 13.5}{43560} = 142 \text{ ac.-ft.}$$

SIZE CLASSIFICATION

Hydraulic Height = 51.5 ft. }
 Storage = 142 ac-ft. } INTERMEDIATE

HAZARD CLASSIFICATION

Dam failure analysis indicates that the channel 0.5
 of Eclipse Dam would be plucked off by 24,000 cfs
 resulting in severe loss of life and economic damages.

\therefore hazard classification is HIGH

TEST FLOOD

INTERMEDIATE size & HIGH hazard \rightarrow PMF test flood

CAMP DRESSER & MCKEE INC.

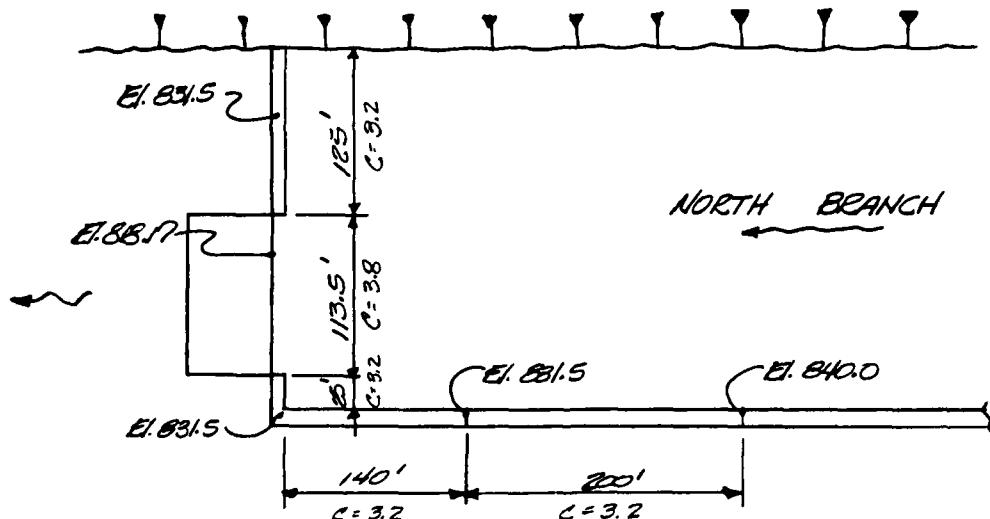
CLIENT CDF
PROJECT ECLIPSE DAM
DETAIL ECLIPSE DAMJOB NO 3806 ET-3
DATE CHECKED 7-27-79
CHECKED BY Joe A.PAGE 2
DATE 7/14/79
COMPUTED BY JOEPROBABLE MAXIMUM FLOOD (PMF)Flood of Record, Nov. 1927 = 9,900 cfs \rightarrow 250 cmDesign flood for reconstruction of dam = 14,600 cfs \rightarrow 375 cm

Terrain: Moderately steep slopes draining to North Branch having mean channel slope of 1.5%. Use mid-point between Rolling and Flat Coastal.

$$PMF = 89 \text{ mi}^2 \times 840 \text{ cfs/mi}^2 = 32,760 \text{ cfs}$$

EXCHARGE-STORAGE RATING

Rating is not applicable for run-of-the-river dam with no overbank storage

STAGE - DISCHARGE RELATIONSHIPS

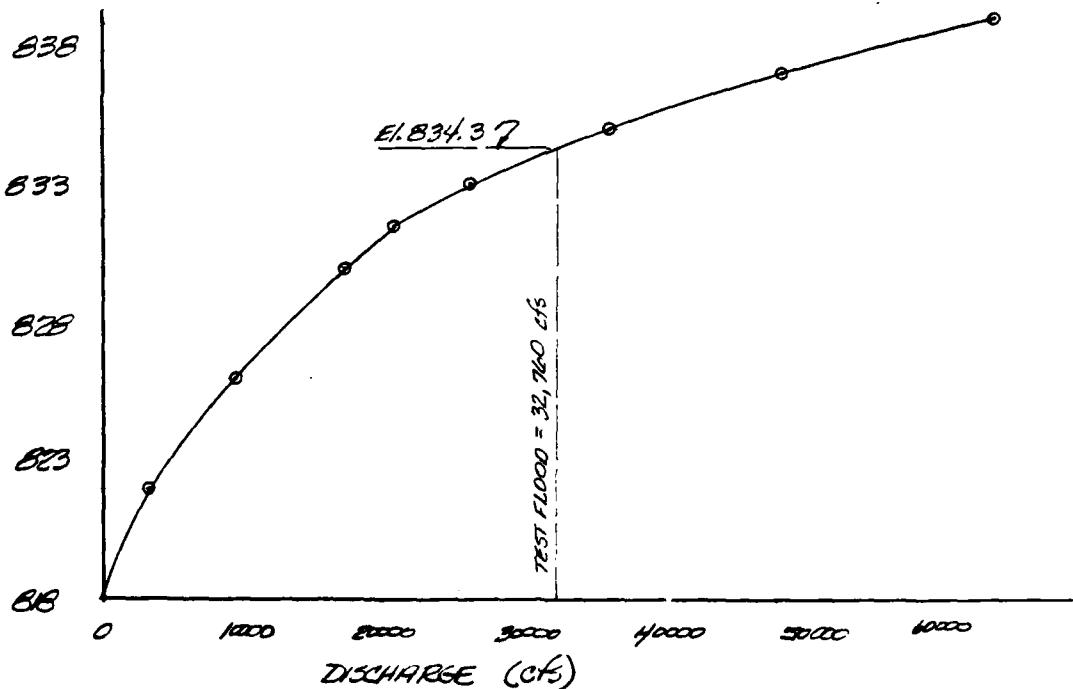
CAMP DREIBER & NOVAK INC.

CLIENT COE
PROJECT ECLIPSE DAM
DETAIL JOB NO 320-6-RT-3
DATE CHECKED 7-27-79
CHECKED BY Joe P.
PAGE 3
DATE 7/11/79
COMPUTED BY JED

ELEV.	DISCHARGE (cfs)			TOTAL Q
	SPILLWAY	ABUTMENTS	LEVEE	
818				
822	3,230	—	—	3,230
826	9,450	—	—	9,450
830	17,550	—	—	17,550
831.5	20,990	—	—	20,990
833.0	24,630	880	900	26,410
835.0	29,780	3,140	3,540	36,460
837.0	35,240	6,190	7,660	49,090
839.0	41,000	9,860	13,300	64,160

At test flood of 32,760 cfs; stage = Elev. 834.26

At Elev. 834.26 Spillway discharge = 27,840
 Overflow (top of dam) = $\frac{2,200}{2,720} \left. \right\} 4,920 \text{ cfs}$
 (Levee) = $\frac{2,720}{32,760 \text{ cfs}}$



TAILWATER ANALYSIS

Assume that flow over spillway (27,840 cfs) and overflows (3,200 cfs) discharges to d/s channel and that flow over levee (2,720 cfs) flows overland down Union St. (ft/s).

$$\therefore \text{flow in d/s channel} = 27,840 + 3,200 \approx 30,000 \text{ cfs}$$

Capacity of d/s channel 635 ft. d/s of Eclipse Dam is only 22,050 cfs, \therefore d/s channel walls will be overtopped (see next page)

$$\text{Spillway Crest Elev.} = 818.17$$

$$\begin{aligned} \text{Top of d/s Channel Wall} \\ \text{at toe of dam} &= 807.0 \\ \text{at } 150' \text{ of toe} &= 796.0 \end{aligned}$$

} indicates fleet tailwater, 807.0 ft, at summer time, spillway crest

OUTLET WORKS CAPACITY

Size : 48-in diameter

Inlet Elevation : 791.0

Inlet Condition : Elbow gate frame on flush wall

Assume inlet control, then

$$Q = CA\sqrt{2gh}$$

$$\text{where: } n = 43'' \phi \rightarrow 12.57 \text{ ft}^2$$

$$h = 818 - 791 = 21 \text{ ft.}$$

$$C = K_L \times 0.6 = 0.92 \times 0.6 = 0.55$$

$$\text{then } Q = 0.55 \times 12.57 (64.4 \times 21)^{1/2} = 254 \text{ cfs}$$

CAMP DRESSER & MCKEE
Environmental Engineers
Boston, Mass

CLIENT CDE
PROJECT ECLIPSE DAM
DETAIL DAM FAILURE

JOB NO 200-16-RT-3
DATE CHECKED 7-27-79
CHECKED BY Joe A.
PAGE 1
DATE
COMPUTED BY

DAM FAILURE ANALYSIS

$$\begin{aligned} \text{Top of Dam} &= 831.5 \\ \text{Toe of Spillway} &= 780.0 \\ 51.5 \text{ ft.} &= y_0 \end{aligned}$$

Assume the two center monoliths of the spillway fail.
Then $W_0 = 57 \text{ ft. or } 50\% \text{ of spillway length}$

$$Q_p = 8/27 W_0^{1/2} Y_0^{3/2} = 8/27 (57)(32.2)^{1/2} (51.5)^{3/2} = 35,420 \text{ cfs}$$

$$\text{Head on Spillway} = 831.5 (\text{W.S.E.I.}) - 818.17 (\text{Crest E.I.}) = 13.33 \text{ ft.}$$

$$\text{Spillway length} = 113.5 \text{ ft.}, \text{ let } C = 3.8$$

$$Q_w = CLH^{3/2} = (3.8)(113.5)(13.33)^{3/2} = 20,990 \text{ cfs}$$

$$\begin{aligned} \text{Total failure flow (Q_f)} &= Q_p + Q_w^{1/2} \\ &= 35,420 + 20,990/2 = 45,915 \text{ cfs} \end{aligned}$$

Downstream channel capacities

Downstream Local Protection Works channel was designed for 14,600 cfs with a freeboard of 3 ft.

Approx. 635 ft. downstream of Eclipse Dam is the
Horse Cotton Mill Dam: Crest length = 100 ft.,
Crest E.I. = 772.2, & Top of Wall E.I. = 788.0
Dam is 8.5 ft. high with a 1:1 upstream face and
a parabolic shaped crest.

$$\begin{aligned} \text{At } Q = 14,600 \text{ cfs, } H = 12' \text{ (from design plans)} \\ \text{then, } C = Q/LH^{3/2} = 14,600/60(12)^{3/2} = 5.85 \end{aligned}$$

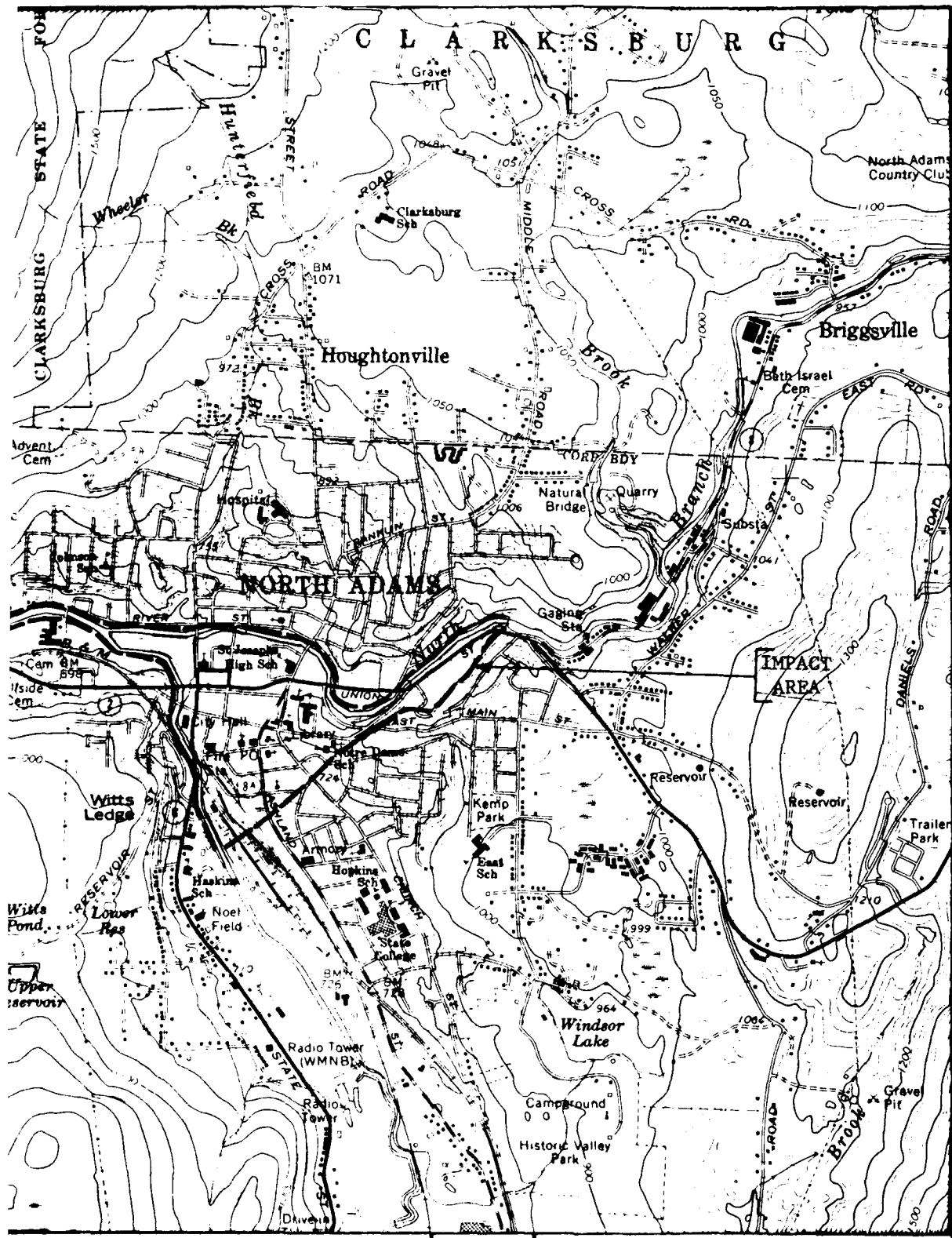
$$\text{At W.S.E.I. } 788.0, H = 15.8 \text{ ft. } Q = (5.85)(60)(15.8)^{3/2} = 22,050 \text{ cfs}$$

Note: 22,050 cfs > 20,990 cfs, no cfs overtopping

prior to dam failure.

$$Q_p >> \text{ds channel capacity: } 45,915 - 22,050 = 23,865 \text{ cfs}$$

In the event of a failure of Eclipse Dam, approx. 24,000 cfs
would overtop the ds head control levees and result in
severe loss of life and property damages. Both residential
and business sections of downtown North Adams would be
substantially flooded.



DAM ECLIPSE DAM

IDENTIFICATION NO. MA 00279

DAM FAILURE IMPACT AREA MAP

APPROX. SCALE: 1" = 2000'

APPENDIX D-7

APPENDIX E
INFORMATION AS CONTAINED IN
THE NATIONAL INVENTORY OF DAMS

NOT AVAILABLE AT THIS TIME

END

FILMED

8-85

DTIC